

Application No. 10/005,880
Response dated September 1, 2004
Reply to Office Action of March 3, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (currently amended): A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,

wherein the copper alloy includes a crystal grain having a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and

wherein the crystal grain has a ratio (a/b) controlled between 0.8 and 1.5, where "a" represents a longer diameter of the crystal grain on a cross section parallel to a direction of final plastic working, and "b" represents a longer diameter of the crystal grain on a cross section perpendicular to the direction of final plastic working. ~~the ratio (a/b) is between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less.~~

Claim 2 (currently amended): A copper alloy material for parts of electronic and electric

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machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, 0.005 to 2.0% by mass in a total amount of at least one selected from the group consisting of Ag, Co and Cr (with the proviso that the Cr content is 0.2% by mass or less), and less than 0.005% by mass (including 0% by 46 mass) of S, with the balance being Cu and inevitable impurities,

wherein the copper alloy includes a crystal grain having a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and

wherein the crystal grain has a ratio (a/b) controlled between 0.8 and 1.5, where "a" represents a longer diameter of the crystal grain on a cross section parallel to a direction of final plastic working, and "b" represents a longer diameter of the crystal grain on a cross section perpendicular to the direction of final plastic working. , the ratio (a/b) is between a longer diameter
a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less.

Claim 3 (withdrawn): A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,

wherein a surface roughness Ra after final plastic working is more than 0 μm and less than 0.1 μm , or a surface roughness Rmax is more than 0 μm and less than 2.0 μm .

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Claim 4 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy.

Claim 5 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy, and is being subjected to a reflow treatment.

Claim 6 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon.

Claim 7 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon, and is being subjected to a reflow treatment.

Claim 8 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Ni or a Ni alloy as an underlayer, and is being

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plated with Au or a Au alloy thereon.

Claim 9 (withdrawn): A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, 0.005 to 2.0% by mass in a total amount of at least one selected from the group consisting of Ag, Co and Cr (with the proviso that the Cr content is 0.2% by mass or less), and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,

wherein a surface roughness Ra after final plastic working is more than 0 μm and less than 0.1 μm , or a surface roughness Rmax is more than 0 μm and less than 2.0 μm .

Claim 10 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy.

Claim 11 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy, and is being subjected to a reflow treatment.

Claim 12 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 9, wherein the copper alloy material for parts of electronic

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and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon.

Claim 13 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon, and is being subjected to a reflow treatment.

Claim 14 (withdrawn): The copper alloy material for parts of electronic and electric machinery and tools according to Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Ni or a Ni alloy as an underlayer, and is being plated with Au or a Au alloy thereon.